

An AI Based ATM Intelligent Security System using Open CV and YOLO

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ABSTRACT

Nowadays most of the surveillance cameras in ATM doesn't record with detail for analysis of incidents. Due to this most of the ATM cases gets unsolved. In this paper a system to improve ATM security is proposed. The proposed system deals with the development of a application using Open CV, YOLO and AI for automation of video surveillance in ATM machines and detect any type of potential criminal activities that might be arising.

KEYWORDS: ATM, Open computer vision (open CV), You only live once (YOLO), Artificial Intelligence (AI)

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INTRODUCTION

It is a well-known fact that digital India is the outcome of many innovation and technological advancements. Nowadays Surveillance cameras in ATM centers are only for recording purpose. If any theft activities are occurred, it will be known only by human information. Then police will start investigating by the help of CCTV records. In some situations, thieves will cover or destroy the camera so it can't record. The world is known to extensive usage of automated video surveillance systems which plays a vital role in our day to day lives in order to enhance protection and security for individuals and infrastructure.

Tracking and detection of objects is an essential component in various traffic monitoring systems, biometrics and security infrastructures, safety monitoring, various web applications and recognition of objects for mobile devices etc. One major application area of this process is the detection of robbery. In this system the primary focus will be in the field of detection of suspicious activities or crime in an ATM (Automatic Teller Machine) which is basically a profitable bank service which enables financial transactions in public spaces where the machines are a replication of the bank clerks and tellers. Although several researches are going on in the field of ATM crime detection, however the utilization of the crime detection system is scarcely observed due to lack of efficiency and processing in the existing crime detection systems. Many researchers found a computer vision application called Open CV and used to implement ray tracking in games. Open CV was also used in 3D designs and for visually impaired people o detect objects in front of them

[1]. Hence the idea of creating such an automated system was conceived after relative observations of the real-life incidents that are happening in and around the globe. The proliferation of the ATM frauds which involves activities like Camera Covering, Money grabbing inside ATM Center, Stealing the ATM Machine, Risky Voice is a matter of concern which would be tackled by the proposed system to enable secure financial transaction at any time.

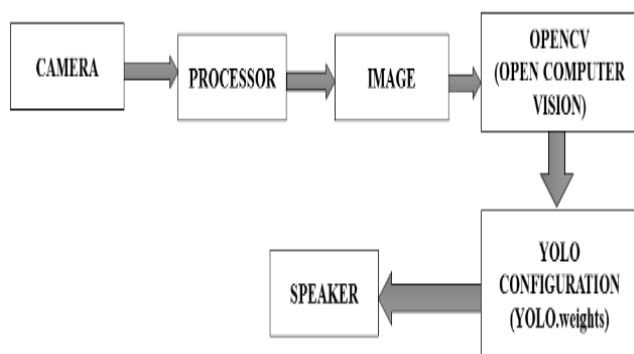
RELATED WORK

In this existing system Surveillance camera is fixed inside the ATM room. It will record video every day. If any problem arises ATM related officers will see the footage and analyze the problem. No one can implement how many members are inside the ATM if there is any damage done to camera by thieves.

Project deals with the security of ATM machine. Whenever robbery occurs, Vibration sensor and MEMS sensor is used here which senses vibration produced from ATM machine and the movement of ATM machine [2]. GSM is used to send the message to the police station and authority. In this project we use PIC controller which is based on embedded system process real time data collected using the MEMS sensor and vibration sensor. When the movement of machine and the vibration is sensed the beep sound will occur from the buzzer [3]. For closing the door of ATM DC Motor is used. Smoke detector is used here to sense the gaseous or smoke near ATM machine.

PROPOSED SYSTEM

In this proposed system We will monitor the whole ATM room [4]. If persons count more than one, inside of the ATM room, buzzer sound will be ring. Watchman and ATM officers Images trained to our processor. So, watchman can help the person inside of the ATM room, in this case the buzzer sound will not ring. If any person stands more than 10 minutes inside of the ATM room, person photos will be stored to crime folder and sent to the official. Photos are also sending via mail alert. In this proposed system we will find persons in real time using AI, OPENCV, YOLO (You only live once). After acquisition of image it has to be pre-processed and compressed. Images are used to train the model. It is trained by performing feature extraction on the image to obtain the required pattern in the image. Followed by feature fusion and dimension reduction to compress the image for reliable and real time performance [5]. Then this YOLO dataset is used to train the classifier. Comparing the performance of various classifiers, we select the optimum one, and thus the person recognition model is achieved. Now any test image may be given to this model which will be classified into one of the classes the model has been trained into.



Working of Open CV and YOLO

Open CV

Open Source Computer Vision Library' initiated by some enthusiast coders in '1999' to incorporate Image Processing into a wide variety of coding languages. It has C++, C, and Python interfaces running on Windows, Linux, Android and Mac.

Officially launched in 1999 the Open CV project was initially an Intel Research initiative to advance CPU-intensive applications, part of a series of projects including real-time ray tracing and 3D display walls. The main contributors to the project included a number of optimization experts in Intel Russia, as well as Intel's Performance Library Team. Disseminate vision knowledge by providing a common infrastructure that developers could build on, so that code would be more readily readable and transferable. Advance vision-based commercial applications by making portable, performance-optimized code available for free – with a license that did not require code to be open or free itself. The first alpha version of Open CV was released to the public at the IEEE Conference on Computer Vision and Pattern Recognition in 2000, and five betas were released between 2001 and 2005. The first 1.0 version was released in 2006. A version 1.1 "pre-release" was released in October 2008. The second major release of the Open CV was in October 2009. Open CV 2 includes major changes to the C++ interface, aiming at easier, more type-safe patterns, new functions, and better implementations for existing ones in terms of performance (especially on multi-core systems). Official releases now occur every six months and development is

now done by an independent Russian team supported by commercial corporations. In August 2012, support for Open CV was taken over by a non-profit foundation OpenCV.org, which maintains a developer and user site. On May 2016, Intel signed an agreement to acquire Intesa leading developer of Open CV. In July 2020, Open CV announced and began a Kick starter campaign for the Open CV AI Kit, a series of hardware modules and additions to Open CV supporting Spatial AI.

YOLO

You Only Look Once (YOLO) is a network that uses Deep Learning (DL) algorithms for object detection. YOLO performs object detection by classifying certain objects within the image and determining where they are located on it. For example, if you input an image of a herd of sheep into a YOLO network, it will generate an output of a vector of bounding boxes for each individual sheep and classify it as such.

Once you insert input an image into a YOLO algorithm, it splits the images into an SxS grid that it uses to predict whether the specific bounding box contains the object (or parts of it) and then uses this information to predict a class for the object.

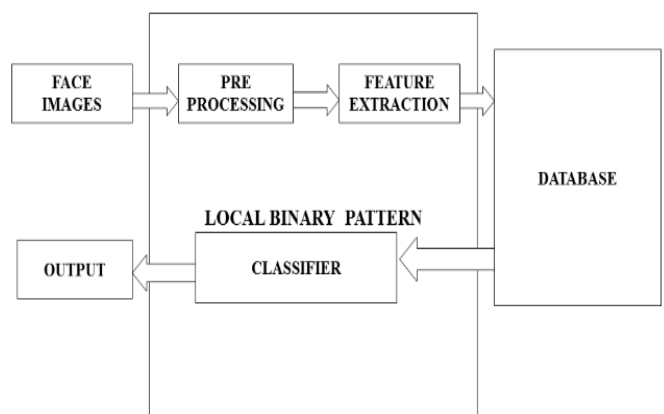
Before we can go into details and explain how the algorithm functions, we need to understand how the algorithm builds and specifies each bounding box. The YOLO algorithm uses four components and additional value to predict an output.

1. The center of a bounding box (b_x b_y)
2. Width (b_w)
3. Height (b_h)
4. The Class of the object (c)

The final predicted value is confidence (p_c). It represents the probability of the existence of an object within the bounding box. The (x,y) coordinates represent the center of the bounding box. Typically, most of the bounding boxes will not contain an object, so we need to use the p_c prediction. We can use a process called non-max suppression to remove unnecessary boxes with low probability to contain objects and those who share big areas with other boxes.

LOCAL BINARY PATTERN

It is a simple yet very efficient texture operator which labels the pixels of an image by thresholding the neighborhood of each pixel and considers the result as a binary number.



Face detection, storing and retrieving

CONCLUSION

This paper discusses about an AI based ATM security system by utilizing Open CV and YOLO. This system uses local binary pattern algorithm to detect the faces and detect the crime. This system also has several features as if the person stands more than ten minutes the buzzer will ring and the photo will be sent to the administrator. This system is proposed to reduce the difficulty of officers to find the person. For the future we will develop the concept and add new features which would help the community even more.

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